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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/869,967	07/10/2001	Hideki Masubuchi	Q65000	4248

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EXAMINER

FISCHER, JUSTIN R

ART UNIT

PAPER NUMBER

1733

5

DATE MAILED: 02/20/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/869,967

Applicant(s)

MASUBUCHI ET AL.

Examiner

Justin R Fischer

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 July 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 5-7, 20 and 21 is/are allowed.
- 6) ☒ Claim(s) 1, 2, 4, 8, 9 and 15-19 is/are rejected.
- 7) ☒ Claim(s) 3 and 10-14 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claim 17 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. As currently drafted, the claim requires that "each of these strands" has a certain construction in line 3, wherein the claim is directed to both core and sheath strands. However, it appears that applicant is only intending to require that each of the sheath strands be formed of a specific construction based on the dependency from claim 9. It is suggested that applicant amend the claim to include such language to better define the scope of the claimed invention.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by Kokon (JP 62-21888). As best depicted in Figures 1 and 2, Kokon teaches a steel cord construction for reinforcement of conveyor belts comprising a core strand (A1) formed of a plurality of filaments and six sheath strands (A2) formed of a plurality of filaments, wherein each of the filaments (3) in an outermost sheath layer of the core strand have a diameter larger

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than that of the filaments (1a) constituting the core layer of the core strand (located inside outermost sheath layer). In particular, the filaments (1a) of the core in the core strand have a diameter of 0.300 millimeters, while the filaments (3) of the outermost sheath layer have a diameter of 0.37 millimeters and 0.55 millimeters. This information was obtained from a USPTO translator (Page 3).

5. Claims 1, 2, and 8 are rejected under 35 U.S.C. 102(b) as being anticipated by Torm (JP 62-57994). A best depicted in Figure 4, Torm is directed to a steel cord construction for reinforcing conveyor belts comprising a core strand (A) formed of a plurality of filaments and six sheath strands (B) formed of a plurality of filaments, wherein each of the filaments (3a,3b) in an outermost sheath layer of the core strand have a diameter larger than that of the filaments (1a,1b,1c) constituting the core layer of the core strand (located inside outermost sheath layer). In particular, the filaments (1a,1b,1c) of the core in the core strand have a diameter of 0.20 millimeters, while the filaments (3a,3b) of the outermost sheath layer of the core strand have a diameter of 0.265 millimeters and 0.390 millimeters, respectively. This information was obtained from a USPTO translator (Page 2).

Regarding claim 2, the core strand of Torm has the following makeup: two sheath layers, each made of a plurality of filaments, are twisted around a core made of three filaments (1a,1b,1c), wherein a diameter of filaments in the outermost sheath layer of the core strand (0.265 or 0.390 mm) is larger than a diameter of the filaments defining the core layer (diameter = 0.20 mm).

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With respect to claim 8, Torm depicts the filaments of the core in the core strand as being directly adjacent one another (i.e. touching). This depiction, as opposed to that depicted in the outermost sheath layer of Figure 5 in which there is a distinct spacing, suggests that the distance between filaments would be less than 0.014 millimeters.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kokon. As best depicted in Figures 1 and 2, Kokon teaches a steel cord construction for the reinforcement of conveyor belts comprising a core strand (A1) formed of a plurality of filaments and six sheath strands (A2) formed of a plurality of filaments, wherein each of the sheath strands is formed by twisting two sheath layers (each made of a plurality of filaments) around a core made of one filament having a diameter d_2 . The reference further suggests (a) that a filament (larger of the reference character 6) in the outermost sheath layer of each sheath strand have a diameter (Φ_s) of 0.53 millimeters and (b) that a filament (larger of the reference character 3) in the outermost sheath layer of the core strand have a diameter (Φ_c) of 0.55 millimeters. Although Kokon fails to expressly recite the quantitative relationship of the claimed invention regarding the diameter of the sheath strand and the diameter of a filament in the outermost sheath layer of said

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sheath strand, one of ordinary skill in the art at the time of the invention would have found it obvious in view of the parameters defined by Kokon, as further set forth below.

As noted above, the filaments in the outermost sheath layer in each sheath strand have multiple diameters: 0.40 and 0.53 millimeters. Additionally, the reference suggests that the core filament of each sheath strand have a diameter (d2) of 0.53 mm and the intermediate sheath filaments in each sheath strand have a diameter (d3) of 0.50 mm. Thus, as depicted in Figure 1, each sheath strand has an approximate diameter that is equivalent to the following relationship: (1 x core filament) + (2 x intermediate sheath filament) + (2 x outermost, small sheath filament). This suggests the diameter of each sheath strand is approximately equal to 2.33 millimeters, which further suggests the following relationship in accordance to the limitations of the claimed invention: [diameter of each sheath strand / diameter of a filament in the outermost sheath layer of each sheath strand] $\sim 2.33 \text{ mm} / 0.53 \text{ mm} \sim 4.4$. It should be emphasized that this value falls directly in the middle of the claimed range (3.4 – 5.5). Lastly, although the diameter of each sheath strand is approximated, it is clearly evident that the diameter would not deviate significantly so as to form a cord construction that does not satisfy the quantitative relationship of the claimed invention.

8. Claims 4, 9, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Torm. As previously stated, Torm discloses a steel cord construction comprising a core strand formed of three core filaments surrounded by two sheath layers. While Torm fails to expressly disclose the claimed quantitative relationship regarding the diameter of the core strand and the actual area occupied by the filaments of the core

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strand, one of ordinary skill in the art at the time of the invention would have found it obvious in view of the parameters defined by Torm, as further set forth below.

In describing the core strand of Figure 4, Torm suggests the following parameters for the circular steel filaments:

- Individual diameter of 1a,1b,1c = 0.200 mm
- Individual diameter of the first sheath filaments 2 = 0.40 mm
- Individual diameter of outermost sheath filaments 3a,3b = 0.265 and 0.39 mm, respectively

These values, in turn, suggest that the filaments of the core strand occupy a total area of approximately 1.60 mm^2 . Based on the limitations of the claimed invention, the total area of the core strand (including interstices) would have to be greater than 1.60 mm^2 and less than 2.2 mm^2 , which further suggests that the diameter of the core strand would have to be less than 1.67 millimeters. Although Torm does not expressly provide the diameter of the core strand, it is evident from Figure 4 that the core strand has a packed assembly in which very small interstices are present. Furthermore, the diameter of the core strand (based on a diagonal from upper right to lower left) is approximately equal to $0.39 + \text{interstice} + \text{core diameter} + 0.40 + 0.265 = 1.06 + \text{core diameter} + \text{interstice}$. Being that the individual filaments of the core are only 0.20 mm, one of ordinary skill in the art at the time of the invention would have expected the overall diameter of the core strand to be less than 1.67 millimeters, such that the occupied are

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of the filaments in the core strand is greater than or equal to 0.730 times the actual area defined by the filaments of the core strand.

With respect to claim 9, Torm (Figure 4) defines a sheath cord (B) having two sheath layers surrounding a core layer formed of one filament. In this instance, the diameter of an outermost sheath filament (7b) in a sheath strand is 0.380 millimeters and a diameter of an outermost sheath filament (3b) in the outermost sheath layer of the core strand is 0.40 millimeters (filament in outermost sheath layer of core strand is greater than filament in outermost sheath layer of sheath strand). Also, applicant requires that the ratio of sheath strand overall diameter to outermost sheath strand filament diameter is between 3.4 and 5.5. Based on the outermost sheath filament diameter of the sheath strand (0.380 mm), the overall diameter of the sheath strand would have to be between approximately 1.3 and 2.1 millimeters. As depicted in Figure 4, the sheath strand has an approximate diameter of $0.70 + 2(0.35) + 2(0.29) = 1.98$ millimeters.

Regarding claim 15, the filaments in the outermost sheath layer of each sheath strand are 0.29 millimeters and 0.38 millimeters.

9. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over either one of Kokon or Torm as applied to claim 9 above, and further in view of Kuromizu (EP 0342492) and Sumitomo (JP 07238480). Kokon and Torm are applied in the same manner as set forth in Paragraphs 5 and 6 above. In describing the respective steel cord constructions for conveyor belts, the references are completely silent as to the tensile strength of the steel filaments. In any event, one of ordinary skill in the art at the

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time of the invention would have recognized the range of the claimed invention as defining a well known and extensively used steel filament, it being further emphasized that the claimed range is extremely broad so as to incorporate a plurality of conventional steel filaments, as evidenced by Kuromizu and Sumitomo. Kuromizu (Page 2, Lines 7-16 and Page 6, Lines 9-11) suggests that conventional steel wires for use in conveyor belts have a tensile strength of at least 2840 MPa (290 kg/mm²), while the preferred embodiment contains a tensile strength between approximately 3,230 MPa and 3,922 MPa (330 – 400 kgf/mm²). In a similar manner, Sumitomo suggests a steel cord reinforcement element for conveyor belts in which the individual steel filaments have a tensile strength of at least 2,940 MPa (300 kgf/mm²), which is nearly identical to that required by the claimed invention. As such, one of ordinary skill in the art at the time of the invention would have found it obvious to form the steel cord of either one of Kokon or Torm from filaments having a tensile strength of at least 3,000 MPa as such a filament is widely used in the reinforcements of conveyor belts, as shown for example by Kuromizu and Sumitomo.

10. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over either one of Kokon or Torm as applied to claim 9 above, and further in view of Watanabe (JP 08170283). Kokon and Torm are applied in the same manner as set forth in Paragraphs 5 and 6 above. Kokon and Torm are each directed to a steel cord construction for the reinforcement of rubber articles, such as conveyor belts, wherein said cords are formed of a multi-layered structure (sheath/core assembly). The references, however, are completely silent with respect to the twisting direction of each

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strand and the sheath layers within each strand. In any event, one of ordinary skill in the art at the time of the invention would have found it obvious to twist the outermost sheath layer and the sheath strand in the same direction since such a design is extensively used in similar, multi-layered steel cord constructions, as shown for example by Watanabe (Abstract and Figures 1-3). In this instance, Watanabe is directed to an extremely similar, multi-layered steel cord construction, as compared to Kokon and Torm, for the reinforcement of rubber articles. As such, one of ordinary skill in the art at the time of the invention would have been motivated to twist the outermost sheath layer and the sheath strand in the same direction, there being no evidence of any unexpected results to establish a criticality for such a design.

11. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over either one of Kokon or Torm as applied to claim 9 above, and further in view of Abe (US 4,762,466). Kokon and Torm are applied in the same manner as set forth in Paragraphs 5 and 6 above. In describing their respective steel cord constructions, however, the reference fail to expressly suggest the use of a wrapping filament. In any event, it is well known and conventional to include outer wrapping filaments with layered steel cord constructions in order to hold the individual strands together and prevent the filaments/wires of each strand from separating, as shown for example by Abe (Figure 1). As such, it would have been obvious to of ordinary skill in the art at the time of the invention to include a wrapping filament in the steel cord construction of either Kokon or Torm, in view of Abe, for the benefits detailed above.

Allowable Subject Matter

12. Claims 5-7, 20, and 21 are allowed. The following is an examiner's statement of reasons for allowance: there was no reference in the prior art search that suggested a multi-layered, steel cord construction for reinforcement of a rubber article wherein the core strand and the sheath strand have the following structure: one or two sheath layers are twisted around a core formed of three filaments, such that the filaments constituting each sheath layer (core and sheath strand) have a larger diameter than the filaments constituting a layer located inside the respective sheath layer. In particular, while such a construction is known in the construction of a core strand, as evidenced by Torm (Figure 4), one of ordinary skill in the art at the time of the invention would not have found it obvious to form both the core and sheath strand in a single steel cord of such a construction. As such, the prior art fails to suggest all the limitations of the claimed invention. Furthermore, regarding claim 20, while several prior art references describe the use of steel cords in a plurality of rubber articles, such as conveyors and pneumatic tires, Kokon and Torm are specifically directed to a steel cord for the reinforcement of conveyor belts and one of ordinary skill in the art at the time of the invention would not have found it obvious to include the cord of either Kokon or Torm in a pneumatic tire.

13. Claims 3 and 10-14 objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

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Conclusion


14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Justin R Fischer** whose telephone number is **(703) 605-4397**. The examiner can normally be reached on M-F (7:30-4:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Ball can be reached on (703) 308-2058. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.


Justin Fischer

February 10, 2003


Michael W. Ball
Supervisory Patent Examiner
Technology Center 1700